



# BUREAU FOR FOOD SECURITY

## PESTICIDE EVALUATION REPORT AND SAFE USE ACTION PLAN (PERSUAP)

### IEE AMENDMENT: §216.3(B) PESTICIDE PROCEDURES

#### PROJECT/ACTIVITY DATA

Project/Activity Name:	Innovative Scientific Research and Technology Transfer to Develop and Implement Integrated Pest Management Strategies for Vegetable and Mango Pests in Asia
Amendment (Y/N):	Yes
Geographic Location(s) (Country/Region):	Asia (Nepal, Cambodia, Bangladesh)
Implementation Start/End:	October 1, 2015 – September 30, 2019
Solicitation/Contract/Award Number:	
Implementing Partner(s):	IPM Innovation Lab
Tracking ID/link:	BFS-18-06-002
Tracking ID/link of Related IEE:	IPM Innovation Lab IEE, signed 9/29/2014

#### ORGANIZATIONAL/ADMINISTRATIVE DATA

Implementing Operating Unit:	Bureau of Food Security
Funding Operating Unit:	Bureau of Food Security
Funding Account(s):	Cooperative Agreement no: AID-OAA-L-15-00001
Funding Amount:	2,000,000
Amendment Funding Date:	Amendment Funding Amount:
Other Affected Unit(s):	
BFS contact:	John Bowman
Lead BEO Bureau:	Bureau of Food Security
Prepared by:	Rangaswamy Muniappan, IPM Innovation Lab, Virginia Tech
Date Prepared:	

#### ENVIRONMENTAL COMPLIANCE REVIEW DATA

Analysis Type:	§216.3(b), Pesticide Procedures – PERSUAP
Environmental Determination(s):	Negative Determination with conditions
Pesticide Procedures Expiration Date:	September 30, 2019

## PESTICIDE PROCEDURES (PERSUAP) EXECUTIVE SUMMARY

The Vegetable Crops IPM project in Asia (Bangladesh, Cambodia and Nepal) requires the use of pesticides for pest management in project trials of vegetable crops in Asia coordinated by the host country principal investigators (PI) listed below:

**Bangladesh:** Yousuf Mian, IPM IL Coordinator in Bangladesh, Bangladesh Agricultural Research Institute (BARI)

**Cambodia:** Michael Roberts, iDE, Cambodia.

**Nepal:** Luke Colavito, iDE, Nepal.

### PESTICIDE EVALUATION REPORT (PER)

All pesticides proposed for use in the Asia Vegetable and Mango IPM project have been evaluated according to the procedures described in §216.3(b)(1)(i) through (v) and identified products that are permitted for use within the program.

### SAFE USE ACTION PLAN (SUAP)

The SUAP summarizes the conditions for the safe use of the pesticide active ingredients recommended in this PERSUAP. Specific safety requirements are provided for each pesticide a.i. individually in Pesticide Data Sheets. All pesticide applications will be carried out either by professional staff employed within the program and or those who have been fully trained in the safe use of pesticides.

### ENVIRONMENTAL DETERMINATION

All pesticide use will be supervised by trained professional specialists and will only take place within trial orchards. All pesticide use will be monitored by host country PI's. Pesticides in the Asia Vegetable and Mango IPM project will only be used when necessary and to the extent necessary to ensure effective pest control. Therefore, the potential for adverse environmental effects is expected to be small.

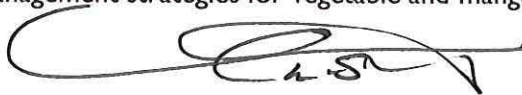
### IMPLEMENTATION

In accordance with 22CFR216 and Agency policy, the conditions and requirements of this document become mandatory upon approval.

#### USAID APPROVAL of Pesticide Procedures


PROJECT/ACTIVITY NAME: Innovative scientific research and technology transfer to develop and implement Integrated Pest Management strategies for vegetable and mango pests in Asia.

Approval:

  
For Acting BFS/ARP Office Director, Jennifer Long

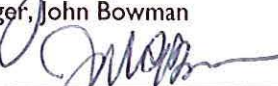
8/8/18  
Date

Clearance:

  
Activity Manager, John Bowman

8/8/18  
Date

Clearance:

  
A/COR, John Bowman

8/8/18  
Date

Concurrence:

  
BFS Bureau Environmental Officer, William Thomas

8/8/18  
Date



# Pesticide Evaluation Review and Safe Use Action Plan (PERSUAP)

## CROP / PEST INFORMATION

As many Asian countries become more developed, the demand for food from horticultural crops is increasing. Although the cereal crops provide staple foods, food from horticultural crops such as vegetables and fruits is an important source of nutrients, minerals, and vitamins for humankind. Nonetheless, pests and diseases are constant threats to horticultural crops.

Crop losses due to pests (insects, diseases, and weeds) are a major constraint to alleviating poverty and improving nutrition in Asia. Most estimates of production and post-harvest losses due to pests range from 30 to 40 percent. Pesticides are often applied in attempts to reduce these losses, but improper use of pesticides is a threat to health and biodiversity. IPM is a decision support system for pest management that goes beyond pesticides and uses evidence-based information to reduce losses due to pests, minimize reliance on synthetic pesticides, and foster long-term sustainability of agricultural systems. IPM components include biological and environmental monitoring, predictive modeling, biological control, insect mating disruption, host plant resistance, grafting, bio-rational pesticides, soil amendments, and habitat management, which are implemented through practices such as crop rotations, antagonistic plants, trap crops, refugia, cover crops, roguing, adoption of pest-resistant varieties, bagging, and sanitation.

The Asian Vegetable and Mango IPM IL program under the IPM Innovation Lab (IPM IL) is implementing ecologically-based, participatory IPM in Bangladesh, Cambodia and Nepal with a focus on pests of tomato, eggplant, cabbage, cauliflower, beans, cucurbits, onion, and mango (the latter crop only for Bangladesh). These countries face threats from traditional and new invasive pests (e.g., *Tuta absoluta*, South American tomato leafminer). Mango is a new crop for the IPM IL project in Bangladesh, but is an important and popular fruit in Bangladesh despite a low and variable yield. It was second in area and first in production among fruits in the country in 2014, with 945,059 metric tons of mangos produced.

The project has been built on previous IPM IL work, which developed and released several vegetable IPM packages in Bangladesh, Cambodia, and to a lesser extent in Nepal. Currently, the IPM IL project is undertaking adaptive research in each of the countries to tailor existing and new IPM practices and packages to local

conditions, especially in Feed-the-Future districts. It is developing and diffusing IPM technologies through close interaction with U.S. and host-country scientists in public and private institutions. It is also working with value chain projects in disseminating and promoting adoption of those technologies to farmers.

## MAJOR PESTS AND DISEASES OF VEGETABLE CROPS

### **Tomato fruitworm** *Helicoverpa armigera* (Lepidoptera: Noctuidae)

This major pest has a wide host range, including tomato, corn, eggplants, crucifers, melons, beans, and others. Larvae feeding on flower buds, flowers, and fruits cause most of the damage.



Tomato fruitworm



*Tuta absoluta* damage on tomato

### **South American tomato leafminer** *Tuta absoluta* (Lepidoptera: Gelechiidae)

The South American tomato leafminer causes damage primarily to tomato but also affects eggplant, potato, and tobacco. It is capable of causing total crop loss by mining all leaves and boring into the fruits unless control measures are adopted. The larvae mine leaves and bore into terminal buds and fruits. Currently it occurs only in Bangladesh and Nepal and not in Cambodia.

### **Cluster caterpillar** *Spodoptera litura* (Lepidoptera: Noctuidae)

It is a polyphagous pest of crops belonging to the families Solanaceae, Malvaceae, Cruciferae, Fabaceae, Araceae, Alliaceae and others. The most conspicuous damage is



caused by early larval instars as hundreds of them feed in clusters and quickly skeletonize leaves.

**Diamondback moth** *Plutella xylostella* (Lepidoptera: Plutellidae)

It is a specific pest of crucifer plants. Plants at all growth stages are susceptible to damage. Larvae feed by chewing holes in leaves and damage is confined to areas between veins. Young larvae feed on the underside of the leaves, leaving the epidermis intact and giving a windowpane appearance. On young plants, the growing tips are eaten and plants become stunted. The larvae also attack developing cabbage heads, making them prone to attack by pathogens.



Diamond back moth larvae



Eggplant fruits and shoot borer damage

**Eggplant fruit and shoot borer** *Leucinodes orbonalis* (Lepidoptera: Pyralidae)

Responsible for extensive yield losses, it is one of the major constraints in eggplant production throughout the tropics in Asia and Africa. The most serious damage is caused by larval feeding inside the fruit, while boring inside the shoot leads to wilting and dying of shoots. The pest has developed resistance to commonly used pesticides due to farmers' indiscriminate use for its control.

**Bean pod borer** *Maruca vitrata* (Lepidoptera: Pyralidae)

It is a pest of leguminous crops. Larvae damage buds, flowers and leaves by feeding and webbing them together. They also bore into pods and feed on seeds. Affected pods have small dark entry holes and sometimes frass is visible.



**Cucurbit fruit fly** *Bactrocera cucurbitae* (Diptera, Tephritidae)

Cucurbit fruit fly, commonly known as melon fly, has a wide host range and is a major pest of cucurbits, tomato, and capsicum. Adult females oviposit on fruits. The eggs



hatch into maggots, which feed within the fruit. Young attacked fruits become distorted

and eventually fall off while the mature fruits develop a water soaked appearance.



Bacterial wilt

**Bacterial wilt** (*Ralstonia solanacearum*)

Bacterial wilt is one of the major diseases of tomato and other solanaceous plants. The disease is known to occur in the wet tropics, subtropics and some temperate regions of the world. It is a soilborne and waterborne pathogen and it can survive and disperse for various periods of time in infested soil or water. Susceptible plants grown in the infected soils will wilt at the flowering stage. Grafting desirable scions on resistant rootstock is one

Bean pod borer

of the options available to overcome this disease.

**Downy mildew** (*Hyaloperonospora parasitica*)

Extent and severity of infection is more pronounced in younger plants than older plants. All aerial plant parts can become infected; however, symptoms appear primarily on leaves and inflorescences. Symptoms appear as dark-colored specks on leaves, usually first on the underside of the leaf. A distinctive characteristic is the presence of fluffy, whitish-grey mass of conidiophores and conidia on the underside of



leaves. A yellow irregular-shaped area appears on the upper side of the leaf corresponding to the sporulation growth on the underside.

### **Powdery Mildew** (*Erysiphe cruciferarum*)

Symptoms occur as white lesions on the upper surface of foliage and later appear as a powdery sugar-like growth. It could also occur on shoots and sometimes on flowers. Leaves turn yellow, die and fall off.

### **Bacterial Leaf Spot** (*Xanthomonas campestris* pv. *Vesicatoria*)

Water soaked lesions are observed on the leaves, fruits and stem. These lesions gradually become necrotic and brown in the center. These necrotic spots can coalesce and cause chlorosis.



Bacterial leaf spot on tomato



Tomato yellow leaf curl virus

### **Tomato yellow leaf curl virus**

It is worldwide in distribution and has over 60 other locally evolved species. The vector of this disease is the whitefly *Bemisia tabaci*. Management of vector and elimination of reservoir hosts reduces this disease incidence.

## **MAJOR PESTS AND DISEASES OF MANGO**

### **Leafhopper** *Idioscopus niveosparsus* (Hemiptera: Cicadellidae)

Both adults and nymphs feed on flowers, causing them to drop. Numerous oviposition punctures on the inflorescence may also contribute to flower drop and poor fruit set. Mango hoppers produce honeydew, which results in the growth of sooty mold, and reduced photosynthesis.

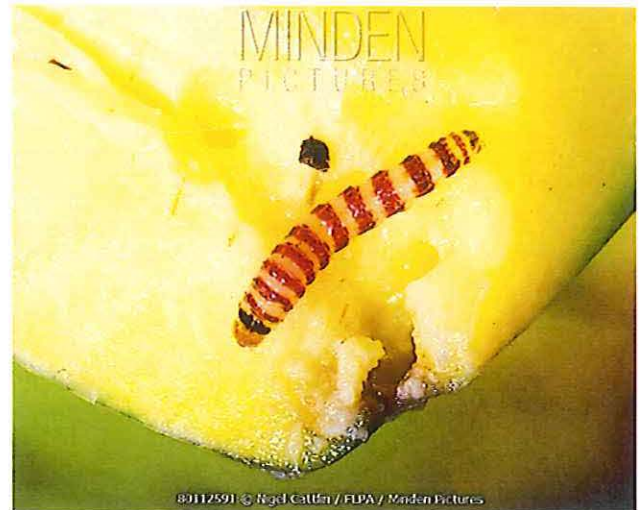


**Fruit borer** *Deanolis sublimbalis* (Lepidoptera: Pyralidae)

Earlier, it had been referred to as *Noorda albizonalis*. Eggs are crimson-white and laid in groups near the peduncle. Larvae have brown-black bodies with red rings at each abdominal segment. The larva feeds on and bores through the pulp. It attacks all developmental stages of the fruit.



Mango hopper



Mango fruit borer

**Mealy Bugs**, *Rastrococcus* spp., *Pseudococcus* spp. (Hemiptera: Pseudococcidae)

Both adults and nymphs of mealybugs suck plant sap, causing reduced plant growth, damaged inflorescences, and premature fruit drop. Mealy bugs excrete honeydew, which enables sooty mold infestation.

**Oriental fruit fly**, *Bactrocera dorsalis* (Diptera: Tephritidae)

The oriental fruit fly is a polyphagous plant pest that affects hundreds of host species. The injury to fruit occurs through oviposition punctures and subsequent larval development. Most of the damage is caused by larvae feeding inside the fruit, resulting in fruit drop.



Oriental fruit fly



Powdery mildew on Mango



### **Anthracnose** (*Colletotrichum gloeosporioides*)

Anthracnose is an important post-harvest disease of mango. It affects leaves, petioles, twigs, blossoms, and fruits. Bagging reduces its incidence on fruits. Post-harvest infection can be managed by post-harvest dipping fruits in hot water ( $45 \pm 2^\circ\text{C}$ ), with fungicide added.

### **Powdery Mildew of mango** (*Oidium mangiferae*)

The fungus attacks the young growth and attacks leaves, flowers and fruits. In the beginning, symptoms appear as small patches of white powdery fungal growth, which later on coalesces to cover a larger area. Severe infection leads to premature flower drop and poor fruit set.

### **Phoma Blight** (*Phoma glomerata*)

Symptoms are visible only on old leaves and appear as minute, angular, irregular, yellow-to-light brown lesions that are scattered over leaf lamina. As the disease progresses, the lesions become large and turn into necrotic areas with grey centers and dark margins. It is then followed by leaf withering and defoliation.

## **INTEGRATED PEST MANAGEMENT**

The IPM program has identified pests of vegetables and mango for which IPM practices are being developed in each country/crop, transferring and testing them where possible, and conducting research to design new practices where necessary. Adaptive research is conducted in each country to tailor the IPM packages to local conditions and collaborations are being undertaken with existing agencies, projects, and the private sector to speed up IPM diffusion, especially in Feed-the-Future regions and districts. IPM techniques and packages are tested in the target regions in coordination with Feed the Future farmer outreach activities in each country. To test the effectiveness of different IPM components, replicated on-farm trials with randomized treatments and farmer practice of control is being conducted in the target districts. For testing IPM packages, farms with similar pest problems and growing conditions are paired together and results of farms implementing IPM packages are compared with results of control farms. For statistical validity, each on-farm trial is run a minimum of

two years. Pests, pesticide use, and crop yields are measured in IPM treatments and compared to the control as metrics of IPM effectiveness.

The pesticides listed in Table 1. will be used for comparison with the bio-pesticides recommended in the project in field trials under the supervision of host country scientists.

## Pesticide Evaluation Report (PER)

Any expenditure of USAID funds which involve the use of pesticides (purchase, recommendation, training, or other related support) shall evaluate each pesticide according to the procedures described in §216.3(b)(1):

- (a) The USEPA registration status of the requested pesticide;
- (b) The basis for selection of the requested pesticide;
- (c) The extent to which the proposed pesticide use is part of an integrated pest management program;
- (d) The proposed method or methods of application, including availability of appropriate application and safety equipment;
- (e) Any acute and long-term toxicological hazards, either human or environmental, associated with the proposed use and measures available to minimize such hazards;
- (f) The effectiveness of the requested pesticide for the proposed use;
- (g) Compatibility of the proposed pesticide with target and non-target ecosystems;
- (h) The conditions under which the pesticide is to be used, including climate, flora, fauna, geography, hydrology, and soils;
- (i) The availability and effectiveness of other pesticides or nonchemical control methods;
- (j) The requesting country's ability to regulate or control the distribution, storage, use and disposal of the requested pesticide;
- (k) The provisions made for training of users and applicators; and
- (l) The provisions made for monitoring the use and effectiveness of the pesticide.

**Table 1: Summary of Approved Pesticides**

Active Ingredient / Technical Name (Trade Name)	EPA Registration Status	Toxicity Class (EPA/WHO signal word)	Crop / Pest	Pre- Harvest Interval	Environmental Toxicity Issues
Acephate	Active, 70506-8	III	Aphids, thrips, leaf miners	7-14 days	Extremely toxic to bees and birds
Acetamiprid	Active, 8033-21	III	Leafhopper, thrips, aphid, whiteflies, leafhopper, striped flea beetle and fruit fly	7 days	Highly toxic to aquatic invertebrates and wildlife.



Azoxystrobin	Active, 100-938	U	Anthracnose, powdery mildew	14 days	Highly toxic to aquatic invertebrates
<i>Bacillus subtilis</i>	Active, 89615-I	U	Lepidopteran pests	0 days	Do not apply directly to water, or allow run-off to enter a waterway
<i>Bacillus thuringiensis</i>	Active, 73049-427	U	Lepidopteran pests	0 days	Do not apply directly to water, or allow run-off to enter a waterway
<i>Beauveria bassiana</i>	Active, 82074-I	U	Lepidopteran pests	0 days	May be toxic to bees, fish and aquatic organisms
Carboxin	738-R-04-015	III	Powdery mildew	na	Non toxic
Chlorantraniliprole	Active, 352-729	U	Lepidopteran pests	0 days	Drift and runoff may be hazardous to aquatic organisms
Chlorpyrifos	Active, 62719-591	II	Aphids, fruit borer	21 days	Extremely toxic to fish and aquatic invertebrates, and birds. Highly toxic to bees
Cypermethrin	Active, 100-1302	Ib	Lepidopteran pests	3-4 weeks	Toxic to fish and aquatic invertebrates
Difenoconazole	Active, 100-739	U	Anthracnose, canker.	0-7 days	Highly toxic to aquatic life with long lasting effects
Dimethoate	Active, 19713-231	II	Onion thrips, aphids, whiteflies, thrips	15 days	Toxic to fish and wildlife; do not apply directly to water; not toxic to birds
Emamectin Benzoate	Active, 100-903	II	Beet webworm, diamond back moth	2 days	Extremely toxic to fish and aquatic invertebrates
Fipronil	Active, 7969-207	II	Aphids, thrips, leaf miners	90 days	Toxic to birds, fish and aquatic invertebrates
<i>Metarhizium anisopliae</i>	Active, 70127-7	U	Lepidopteran pests	0 days	No major threats to non-target ecosystems
Metiram	Active, 7969-	III	Late blight of	15-25	Slightly toxic to

	105-34704		potato and tomato	days	fish, birds
Propiconazole	Active, 42750-212	U	Anthrachnose	30 days	This pesticide is toxic to fish and shrimp
<i>Pseudomonas fluorescens</i>	Active, 71975-U	U	Soil borne diseases	0 days	Do not apply directly to water, or allow run-off to enter a waterway
Thiamethoxam	Active, 100-938	III	Leafhopper, thrips, aphid, whiteflies, leafhopper, stripped flea beetle and fruit fly	7 days	Highly toxic to aquatic invertebrates and wildlife
Thiophanate Methyl	Active, 1381-228	IV	Powdery mildew, rust	14 days	Toxic to fish
<i>Trichoderma harzianum</i>	Active, 68539-4	U	Soil borne pathogens	0 days	None

**PESTICIDE DATA SHEETS** – Attached

**PESTICIDE USE RECORD – EXAMPLE FOR FIELD USE**

PESTICIDE APPLICATION DETAILS						Wind		Applicator
Date	Pesticide	Rate	Crop	volume	Location	Speed	Direction	Name / tel



## SAFE USE ACTION PLAN (SUAP)

The SUAP summarizes what the conditions are for the safer use of the pesticide a.i.'s recommended in this PERSUAP. Specific safety requirements are provided for each pesticide a.i. individually in Pesticide Data Sheets (end of this document).

This section describes the actions which will be taken to ensure each of the pesticide recommended in this PERSUAP can be used safely by the intended project participant. This includes complete and implementable plans for: 1) targeted training for farmers, agricultural extension agents, handlers, applicators; 2) establishing pesticide quality, use of regulatory labels (or other guidance), and container standards; 3) pesticide-appropriate PPE to be sustainably used and supplied; 4) location-specific good practice methods for safe pesticide transport, storage, handling, use, and disposal, as well as safe management and disposal of empty pesticide containers.

This document require that the Implementing Partner develop a Safe Use Action Plan which includes a list of the implementation team members, what their duties are, and a timeline of when things will get done. It is critical to describe a field-implementable training programs for all involved in the activity, including farmers, handlers, and applicators. Establish a sustainable plan to ensure pesticide quality, use of labels or other guidance, and container standards. Describe the plan which will be used to ensure that pesticide-appropriate PPE is sustainably used and supplied. Create location-specific good practice methods for safe pesticide transport, storage, handling, use, and disposal.

### **SUAP Conditions for the Implementing Partner (IP):**

1. The IP will develop a SUAP that is specific to the intervention area and implementing partner organizations.
2. Only pesticides with approved (by USEPA and host-government or a designated body where applicable) active ingredients can be procured, used or recommended for use with USAID funds.
3. Pesticide products procured, used or recommended for use must be labelled in a national language and include the following essential information: name and concentration of active ingredient, type of formulation, instructions for use, user safety information, safety periods for re-entry and harvest, Manufacturer and country of origin.
4. Basic training in safer use must be provided broadly
5. Advanced training required for certain AIs and products
6. Pesticides for plant protection must be part of an IPM scheme
7. Appropriate Personal Protective Equipment (PPE) must be available.
8. Observance of label instructions and safe pesticide purchase, handling, storage and disposal practices.
9. Record-keeping & resistance monitoring
10. Regular implementation reporting
11. Pass-down to subcontractors and grantees

The following template can be used to implement a robust Safer Use Action Plan (SUAP). Additional information can be added, depending on location needs and issues. The end result should be a clear plan to ensure all aspects of USAID funded pesticide use focus on safety.

Innovative Scientific Research and Technology Transfer to Develop and Implement Integrated Pest Management Strategies for Vegetable and Mango Pests in Asia					
Pesticide(s):			Crops: Vegetable and Mango		
Location Common Name(s):			Target Pests:		
Required Compliance Mitigation Measures		Compliance Dates	Actions to achieve compliance	Responsible Party	Status
Capacity Building	Technical Assistance for Trainers		Appoint a coordinator responsible for ensuring the PERSUAP is implemented properly	Host Country PI's	
	Development and Distribution of Educational Material		Ensure all staff, including new recruits, have received appropriate training.	Host Country PI's	
	Training of Pesticide Handlers		Review existing procedures and update if required	Host Country PI's	
Local Issues	Establish Pesticide Quality Standards		Review existing procedures and update if required	Host Country PI's	
	Require Good Packaging and Clear, Adequate Labeling		Ensure all partners and growers are supplied with and understand guidance documents. Translate into local language for use in Vietnam	Field staff	
Safer Pesticide Use	Ensure Accessibility of Personal Protective Equipment		Review PPE to ensure that all necessary equipment is available and fully functional	Host Country PI's	
	Define Appropriate Procedures for Safe Pesticide Transport		Review existing procedures and update if required	Host Country PI's	
	Define Appropriate Methods for Safe Pesticide Storage		Review existing procedures and update if required	Host Country PI's	
	Define Disposal Provisions for Used Pesticide Containers		Review existing procedures and update if required	Host Country PI's	
Long-Term Program	Coordination, Collaboration, Awareness raising, Surveillance, Control Management, Research		Review PERSUAP requirements and implementation	Head of Program	



## USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): Acephate		Pesticide Use Type: insecticide	
Formulation: Soluble granules	% AI: 97%	Location Common Names: Nayak	
USEPA registration status, code, & date: Active, 70506-8		Location registration status & date: add information for specific use location	
US Common Name:		USEPA Tox Signal word: Caution	USEPA RUP flag: GUP
Chemical Abstract Service (CAS) Registry Number: 30560-19-1		USEPA PC Code: 103301	WHO Tox Class: III
Location Registration Code: specific to location			
1. Basis for Selection: Systemic insecticide used to control sucking and biting insects by direct contact or ingestion.	2. Crop / Target: Vegetable crops	3. Pest / Disease: Aphids, thrips, leaf miners	4. Effectiveness: Registered for use in U.S.
5. Alternatives: Selected biopesticides	6. Role in IPM: Monitor insect populations to determine whether or not there is a need for application based on locally determined economic thresholds. It will be used until an effective less toxic biopesticide is identified, which is also compatible with parasitoids and predators and appropriate to IPM objectives. It will also be rotated with pesticides from other classes.	7. Human Toxicological Hazards	8. Environmental Hazards
		Long-Term: Not a possible carcinogen.	General: Extremely toxic to bees and birds
		Acute: Harmful if swallowed.	Non-Target Organisms: Highly toxic to bees, direct exposure
		Non-Target Ecosystems: Aquatic areas, streams, ponds,	
9. Location Environmental Conditions: Vegetable crop fields in Bangladesh, Cambodia, Nepal	10. Application Methods: Follow label per formulation	12. Storage Provisions and Disposal Issues: Empty containers: rinse 3 times, empty into spray tank, puncture, bury Containers should NEVER be reused	14. Training Program Elements: - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	11. Personal Protective Equipment: Long-sleeved shirts and pants, chemical resistant gloves, protective eye wear, shoes, & socks	13. Location Regulatory Issues Same as in # 9	
15. Monitoring Plan: use, storage, transport, dispersal, disposal			

USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): ACETAMIPRID		Pesticide Use Type: insecticide	
Formulation: Soluble granules	% AI: 70%	Location Common Names:	
USEPA registration status, code, & date: Active, 8033-21, 05/23/2011		Location registration status & date: add information for specific use location	
US Common Name: Assail TM		USEPA Tox Signal word: Harmful	USEPA RUP flag: GUP WHO Tox Class: III
Chemical Abstract Service (CAS) Registry Number: 135410-20-7		USEPA PC Code: 099050	Location Registration Code: specific to location
1. Basis for Selection: Systemic insecticide with translaminar activity and with contact and stomach action.	2. Crop / Target: Cucumber, eggplant, water melon, bitter gourd, brassicas, pumpkin, beans, Mango	3. Pest / Disease: Leafhopper, thrips, aphid, whiteflies, leafhopper, stripped flea beetle, fruit fly	4. Effectiveness: Registered for use in U.S.
5. Alternatives: Selected biopesticides	6. Role in IPM: Monitor insect populations to determine whether or not there is a need for application based on locally determined economic thresholds. It will be used until an effective less toxic biopesticide is identified, which is also compatible with parasitoids and predators and appropriate to IPM objectives. It will also be rotated with pesticides from other classes.	7. Human Toxicological Hazards	8. Environmental Hazards
		Long-Term: Not a possible carcinogen.	General: Extremely toxic to fish and aquatic invertebrates
		Acute: Harmful if swallowed, inhaled or absorbed through skin. Causes moderate eye irritation.	Non-Target Organisms: Highly toxic to bees, direct exposure
			Non-Target Ecosystems: Aquatic areas, streams, ponds,
9. Location Environmental Conditions: Vegetable crop fields in Bangladesh, Cambodia, Nepal and Mango in Bangladesh	10. Application Methods: Follow label per formulation	12. Storage Provisions and Disposal Issues: Empty containers: rinse 3 times, empty into spray tank, puncture, bury Containers should NEVER be reused	14. Training Program Elements: - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	11. Personal Protective Equipment: Long-sleeved shirts and pants, chemical resistant gloves, protective eye wear, shoes, & socks	13. Location Regulatory Issues Same as in # 9	
15. Monitoring Plan: use, storage, transport, dispersal, disposal			



USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): AZOXYSTROBIN		Pesticide Use Type: Fungicide	
Formulation: SUSPENSION CONCENTRATE	% AI: 250%	Location Common Names: Amistar	
USEPA registration status, code, & date: Active, 100-938		Location registration status & date: add information for specific use location	
US Common Name: Amistar		USEPA Tox Signal word: Caution	USEPA RUP flag: GUP WHO Tox Class: U
Chemical Abstract Service (CAS) Registry Number: 131860-33-8		USEPA PC Code: 128810	Location Registration Code: specific to location
1. Basis for Selection: it has protectant, eradicant, curative, translaminar and systemic properties. it inhibits spore germination and mycelian growth and shows antispore activity.	2. Crop / Target: Vegetables and Mango	3. Pest / Disease: Anthracnose, powdery mildew	4. Effectiveness: Registered and used in U.S.
5. Alternatives: Selected biopesticides.	6. Role in IPM: These fungicides will be used against fungal pathogens until other biorational options are available to manage fungal diseases.	7. Human Toxicological Hazards	8. Environmental Hazards
		Long-Term: Not a possible carcinogen.	General: Highly toxic to aquatic invertebrates
		Acute: Harmful if absorbed through skin, swallowed or inhaled. Causes moderate eye irritation.	Non-Target Organisms:  Non-Target Ecosystems: Aquatic areas, streams, ponds,
9. Location Environmental Conditions: Vegetable crop fields in Bangladesh, Cambodia, Nepal and Mango in Bangladesh	10. Application Methods: Follow label for specific application method. Do not apply within 7 days of harvest. Do not apply before a rain event.	12. Storage Provisions and Disposal Issues: Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.	14. Training Program Elements: - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	11. Personal Protective Equipment: Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	13. Location Regulatory Issues Same as in # 9	
15. Monitoring Plan: use, storage, transport, dispersal, disposal			

## USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): Bacillus thuringiensis (Bt)		Pesticide Use Type: insecticide	
Formulation: Wettable powder	% AI: 12.65%	Location Common Names: Mahastra	
USEPA registration status, code, & date: Active, 73049-427, 2/23/2006		Location registration status & date: add information for specific use location	
US Common Name: Dipel, Thuricide		USEPA Tox Signal word: Caution	USEPA RUP flag: Not Restricted WHO Tox Class: U
Chemical Abstract Service (CAS) Registry Number: 0068038-71-1		USEPA PC Code: 006522	Location Registration Code: specific to location
<b>1. Basis for Selection:</b> Bacillus thuringiensis is a bacterium that acts as a biological fungicide. It is a naturally occurring soil bacterium effective against fungal infections and is accepted for use in organic farming. It is not expected to have any adverse effects on nontarget organisms. It is proposed as an environmentally preferred alternative to other more toxic pest management techniques.	<b>2. Crop / Target:</b> Vegetable crops and Mango	<b>3. Pest / Disease:</b> Lepidopteran pests	<b>4. Effectiveness:</b> Registered for use in US for similar pests.
<b>5. Alternatives:</b> Selected biopesticides	<b>6. Role in IPM:</b> Monitor insect populations to determine whether or not there is a need for application based on locally determined economic thresholds. It will be used until an effective less toxic biopesticide is identified, which is also compatible with parasitoids and predators and appropriate to IPM objectives. It will also be rotated with pesticides from other classes	<b>7. Human Toxicological Hazards</b>	<b>8. Environmental Hazards</b>
		<b>Long-Term:</b> No known mammalian chronic health effects.	<b>General:</b> Do not apply directly to water, or allow run-off to enter a waterway
		<b>Acute:</b> May cause moderate eye irritation. Practically non-toxic to humans and animals by acute exposure.	<b>Non-Target Organisms:</b> Threatened or endangered Lepidoptera
		<b>Non-Target Ecosystems:</b> Aquatic areas	
<b>9. Location Environmental Conditions:</b> Vegetable crop fields in Bangladesh, Cambodia, Nepal and Mango in Bangladesh	<b>10. Application Methods:</b> Follow label for specific application method. Do not apply before a rain event.	<b>12. Storage Provisions and Disposal Issues:</b> Empty containers: rinse 3 times, empty into spray tank, puncture, bury Containers should NEVER be reused	<b>14. Training Program Elements:</b> - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	<b>11. Personal Protective Equipment:</b> Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	<b>13. Location Regulatory Issues</b> Same as in # 9	
<b>15. Monitoring Plan:</b> use, storage, transport, dispersal, disposal			



# USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): Bacillus subtilis (Bt)		Pesticide Use Type: Fungicide	
Formulation: Wettable powder		% AI: 12.65%	
USEPA registration status, code, & date: Active, 89615-1		Location Common Names:	
US Common Name:		Location registration status & date: add information for specific use location	
Chemical Abstract Service (CAS) Registry Number: 0068038-70-0		USEPA Tox Signal word: Caution	USEPA RUP flag: Not Restricted
		WHO Tox Class: U	
		USEPA PC Code: 129082	Location Registration Code: specific to location
1. Basis for Selection: Bacillus is a bacterium that acts as a biological fungicide. It is a naturally occurring soil bacterium effective against fungal infections and is accepted for use in organic farming. It is not expected to have any adverse effects on nontarget organisms. It is proposed as an environmentally preferred alternative to other more toxic pest management techniques.	2. Crop / Target: Vegetable crops and Mango	3. Pest / Disease: Fungal diseases	4. Effectiveness: Has been registered for use in US for similar pests.
5. Alternatives: Selected biopesticides	6. Role in IPM: Monitor insect populations to determine whether or not there is a need for application based on locally determined economic thresholds. It will be used until an effective less toxic biopesticide is identified, which is also compatible with parasitoids and predators and appropriate to IPM objectives. It will also be rotated with pesticides from other classes	7. Human Toxicological Hazards Long-Term: No known mammalian chronic health effects. Acute: May cause moderate eye irritation. Practically non-toxic to humans and animals by acute exposure.	8. Environmental Hazards General: Do not apply directly to water, or allow run-off to enter a waterway Non-Target Organisms: Threatened or endangered Lepidoptera Non-Target Ecosystems: Aquatic areas
9. Location Environmental Conditions: Vegetable crop fields in Bangladesh, Cambodia, Nepal and Mango in Bangladesh	10. Application Methods: Follow label for specific application method. Do not apply before a rain event.	12. Storage Provisions and Disposal Issues: Empty containers: rinse 3 times, empty into spray tank, puncture, bury Containers should NEVER be reused	14. Training Program Elements: - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	11. Personal Protective Equipment: Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	13. Location Regulatory Issues Same as in # 9	
15. Monitoring Plan: use, storage, transport, dispersal, disposal			

## USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): BEAUVERIA BASSIANA		Pesticide Use Type: Biological	
Formulation: Wettable powder	% AI: 22	Location Common Names:	
USEPA registration status, code, & date: Active, 82074-1, 3/10/1997		Location registration status & date: add information for specific use location	
US Common Name: Mycotrol wpo		USEPA Tox Signal word: Caution	USEPA RUP flag: Not Restricted WHO Tox Class: U
Chemical Abstract Service (CAS) Registry Number: 63428-82-0		USEPA PC Code: 128924	Location Registration Code: specific to location
<b>1. Basis for Selection:</b> Beauveria bassiana is a naturally occurring fungal insecticide that is commonly found in soils worldwide and is used as a pesticide for controlling many kinds of insects.	<b>2. Crop / Target:</b> Vegetables and Mango	<b>3. Pest / Disease:</b> Lepidopteran pests	<b>4. Effectiveness:</b> Registered for use in US for similar pests.
<b>5. Alternatives:</b> Selected biopesticides.	<b>6. Role in IPM:</b> Monitor insect populations to determine whether or not there is a need for application based on locally determined economic thresholds. It will also be rotated with pesticides from other classes	<b>7. Human Toxicological Hazards</b>	<b>8. Environmental Hazards</b>
		<b>Long-Term:</b> No expected long-term risks.	<b>General:</b> May be toxic to bees, fish and aquatic organisms
		<b>Acute:</b> Causes moderate eye irritation. Harmful if absorbed through the skin, inhaled or swallowed. May produce an allergic reaction.	<b>Non-Target Organisms:</b> Potentially pathogenic to honey bees
<b>9. Location Environmental Conditions:</b> Vegetable crop fields in Bangladesh, Cambodia, Nepal and Mango in Bangladesh	<b>10. Application Methods:</b> Follow label per formulation	<b>12. Storage Provisions and Disposal Issues:</b> Empty containers: rinse 3 times, empty into spray tank, puncture, bury Containers should NEVER be reused	<b>14. Training Program Elements:</b> - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	<b>11. Personal Protective Equipment:</b> Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	<b>13. Location Regulatory Issues</b> Same as in # 9	
<b>15. Monitoring Plan:</b> use, storage, transport, dispersal, disposal			



## USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): Carboxin		Pesticide Use Type: Fungicide	
Formulation: Wettable powder	% AI: %	Location Common Names: Vitaxin	
USEPA registration status, code, & date: Active, 738-R-04-015		Location registration status & date: add information for specific use location	
US Common Name:		USEPA Tox Signal word: Caution	USEPA RUP flag: GUP
Chemical Abstract Service (CAS) Registry Number: 5234-68-4		USEPA PC Code: 090201	Location Registration Code: specific to location
<b>1. Basis for Selection:</b> Carboxin is a group G, oxathiin, systemic fungicide with protective and curative action. It is also a growth regulant that increases coleoptile length of cereal seedlings.	<b>2. Crop / Target:</b> Vegetables	<b>3. Pest / Disease:</b> Powdery mildew	<b>4. Effectiveness:</b> Registered in U.S.
<b>5. Alternatives:</b> Selected biopesticides.	<b>6. Role in IPM:</b> These fungicides will be used against fungal pathogens until other biorational options are available to manage fungal diseases.	<b>7. Human Toxicological Hazards</b>	<b>8. Environmental Hazards</b>
		Long-Term: Not a possible carcinogen.	General: Non toxic
		Acute: Toxic by inhalation. Causes moderate eye irritation.	Non-Target Organisms:  Non-Target Ecosystems: Aquatic areas, streams, ponds,
<b>9. Location Environmental Conditions:</b> Vegetable crop fields in Bangladesh, Cambodia, Nepal	<b>10. Application Methods:</b> Follow label for specific application method. Do not apply within 7 days of harvest. Do not apply before a rain event.	<b>12. Storage Provisions and Disposal Issues:</b> Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.	<b>14. Training Program Elements:</b> - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	<b>11. Personal Protective Equipment:</b> Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	<b>13. Location Regulatory Issues</b> Same as in # 9	
<b>15. Monitoring Plan:</b> use, storage, transport, dispersal, disposal			

USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): CHLORPYRIFOS		Pesticide Use Type: Insecticide	
Formulation: Emulsion concentrate	% AI: 40.2	Location Common Names: Bann	
USEPA registration status, code, & date: Active, 62719-591		Location registration status & date: add information for specific use location	
US Common Name: Lorsban Advanced		USEPA Tox Signal word: Warning	USEPA RUP flag: Restricted WHO Tox Class: II
Chemical Abstract Service (CAS) Registry Number: 2921-88-2		USEPA PC Code: 059101	Location Registration Code: specific to location
1. Basis for Selection: It belongs to organophosphate class of chemicals. It is non systemic insecticide with contact, stomach and respiratory action.	2. Crop / Target: Vegetables	3. Pest / Disease: Aphids, fruit borer	4. Effectiveness: Registered in US
5. Alternatives: Selected biopesticides	6. Role in IPM: Monitor insect populations to determine whether or not there is a need for application based on locally determined economic thresholds. It will be used until an effective less toxic biopesticide is identified, which is also compatible with parasitoids and predators and appropriate to IPM objectives. It will also be rotated with pesticides from other classes.	7. Human Toxicological Hazards	8. Environmental Hazards
		Long-Term: Not a possible carcinogen.	General: Extremely toxic to fish and aquatic invertebrates, and birds
		Acute: Fatal if swallowed. Harmful if inhaled. Causes moderate skin and eye irritation.	Non-Target Organisms: Highly toxic to bees, direct exposure
9. Location Environmental Conditions: Vegetable crop fields in Bangladesh, Cambodia, Nepal	10. Application Methods: Follow label per formulation	12. Storage Provisions and Disposal Issues: Empty containers: rinse 3 times, empty into spray tank, puncture, bury Containers should NEVER be reused	14. Training Program Elements: - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	11. Personal Protective Equipment: long-sleeved shirts and pants, chemical resistant gloves, protective eye wear, shoes, & socks	13. Location Regulatory Issues Same as in #9	
15. Monitoring Plan: use, storage, transport, dispersal, disposal			



## USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): CHR LORANTRANILIPROLE		Pesticide Use Type: Insecticide	
Formulation: Suspension Concentrate	% AI: 18.5%	Location Common Names:	
USEPA registration status, code, & date: Active, 352-729, 5/1/2008		Location registration status & date: add information for specific use location	
US Common Name: Coragen		USEPA Tox Signal word: n/a	USEPA RUP flag: Not Restricted WHO Tox Class: U
Chemical Abstract Service (CAS) Registry Number: 0500008-45-7		USEPA PC Code: 352-GA-002	Location Registration Code: specific to location
<b>1. Basis for Selection:</b> It acts primarily through ingestion and also through contact. Affected insects rapidly stop feeding, general lethargy, paralysis and ultimate death. Effective against chewing pests pests of cotton, vegetable and fruits.	<b>2. Crop / Target:</b> Vegetables	<b>3. Pest / Disease:</b> Lepidopteran pests.	<b>4. Effectiveness:</b> Registered for use in US
<b>5. Alternatives:</b> Selected biopesticides	<b>6. Role in IPM:</b> Monitor insect populations to determine whether or not there is a need for application based on locally determined economic thresholds. It will be used until an effective less toxic biopesticide is identified, which is also compatible with parasitoids and predators and appropriate to IPM objectives. It will also be rotated with pesticides from other classes	<b>7. Human Toxicological Hazards</b>	<b>8. Environmental Hazards</b>
		Long-Term: No toxicologically significant effects were found.	General: Drift and runoff may be hazardous to aquatic organisms
		Acute: > 5,000 mg/kg No toxicologically significant effects were found.	Non-Target Organisms: Aquatic invertebrates, oysters, shrimp
<b>9. Location Environmental Conditions:</b> Vegetable crop fields in Bangladesh, Cambodia and Nepal	<b>10. Application Methods:</b> Follow label per formulation	<b>12. Storage Provisions and Disposal Issues:</b> Empty containers: rinse 3 times, empty into spray tank, puncture, bury Containers should NEVER be reused	<b>14. Training Program Elements:</b> - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	<b>11. Personal Protective Equipment:</b> Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	<b>13. Location Regulatory Issues</b> Same as in # 9	
<b>15. Monitoring Plan:</b> use, storage, transport, dispersal, disposal			

## USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): CYPERMETHRIN		Pesticide Use Type: Insecticide	
Formulation: Emulsifiable Concentrate	% AI: 9.6	Location Common Names: Acmethrin -10	
USEPA registration status, code, & date: Active, 100-1302		Location registration status & date: add information for specific use location	
US Common Name: Mustang-Max		USEPA Tox Signal word: Warning	USEPA RUP flag: Restricted WHO Tox Class: I b
Chemical Abstract Service (CAS) Registry Number: 52315-07-8		USEPA PC Code: 109702	Location Registration Code: specific to location
1. Basis for Selection: It is a member of the pyrethroid class with contact and stomach action. It acts on the nervous system of insects, disturbs the function of neurons by interaction with sodium channels.	2. Crop / Target: Vegetables.	3. Pest / Disease: Lepidopteran pests	4. Effectiveness: Has been registered and used against Spodoptera frugiperda in US.
5. Alternatives: Selected biopesticides	6. Role in IPM: Monitor insect populations to determine whether or not there is a need for application based on locally determined economic thresholds. It will be used until an effective less toxic biopesticide is identified, which is also compatible with parasitoids and predators and appropriate to IPM objectives. It will also be rotated with pesticides from other classes.	7. Human Toxicological Hazards	8. Environmental Hazards
		Long-Term: May be a possible carcinogen.	General: Toxic to fish and aquatic invertebrates
		Acute: Harmful if swallowed, inhaled or absorbed through skin. Causes moderate eye irritation.	Non-Target Organisms: Highly toxic to bees, direct exposure
			Non-Target Ecosystems: Aquatic areas, streams, ponds,
9. Location Environmental Conditions: Vegetable crop fields in Bangladesh, Cambodia, Nepal	10. Application Methods: Follow label per formulation	12. Storage Provisions and Disposal Issues: Empty containers: rinse 3 times, empty into spray tank, puncture, bury Containers should NEVER be reused	14. Training Program Elements: - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	11. Personal Protective Equipment: long-sleeved shirts and pants, chemical resistant gloves, protective eye wear, shoes, & socks	13. Location Regulatory Issues Same as in # 9	
15. Monitoring Plan: use, storage, transport, dispersal, disposal			



## USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): DIFENOCONAZOLE		Pesticide Use Type: Fungicide	
Formulation: EMULSION CONCENTRATE	% AI: 250%	Location Common Names: Score	
USEPA registration status, code, & date: Active, 100-739		Location registration status & date: add information for specific use location	
US Common Name: Score		USEPA Tox Signal word: Danger	USEPA RUP flag: WHO Tox Class: U
Chemical Abstract Service (CAS) Registry Number: 119446-68-3		USEPA PC Code: 128847	Location Registration Code: specific to location
1. Basis for Selection: It is a broad-spectrum fungicide used for disease control in many fruits, vegetables, cereals and other field crops. It has preventive and curative action. Difenoconazole acts by inhibition of demethylation during ergosterol synthesis	2. Crop / Target: Vegetables	3. Pest / Disease: Anthracnose, canker	4. Effectiveness: Registered and used on various diseases of vegetable crops in U.S.
5. Alternatives: Selected biopesticides.	6. Role in IPM: These fungicides will be used against fungal pathogens until other biorational options are available to manage fungal diseases.	7. Human Toxicological Hazards	8. Environmental Hazards
		Long-Term: Not a possible carcinogen.	General: Highly toxic to aquatic life with long lasting effects
		Acute: Fatal if swallowed or inhaled. Causes serious eye irritation.	Non-Target Organisms: Non-Target Ecosystems: Aquatic areas, streams, ponds,
9. Location Environmental Conditions: Vegetable crop fields in Bangladesh, Cambodia, Nepal	10. Application Methods: Follow label for specific application method. Do not apply within 7 days of harvest. Do not apply before a rain event.	12. Storage Provisions and Disposal Issues: Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.	14. Training Program Elements: - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	11. Personal Protective Equipment: Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	13. Location Regulatory Issues Same as in # 9	
15. Monitoring Plan: use, storage, transport, dispersal, disposal			

# USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): DIMETHOATE		Pesticide Use Type: Insecticide	
Formulation: Emulsifiable Concentrate	% AI: 43.5%	Location Common Names: Allrogor	
USEPA registration status, code, & date: Active, 19713-231		Location registration status & date:	
US Common Name: Drexel		USEPA Tox Signal word: Warning	USEPA RUP flag: GUP
Chemical Abstract Service (CAS) Registry Number: 60-51-5		USEPA PC Code: 035001	Location Registration Code: specific to location
1. Basis for Selection: Systemic insecticide and acaricide with contact and stomach action. It is a cholinesterase inhibitor.	2. Crop / Target: Vegetable crops	3. Pest / Disease: Borers, aphids, whiteflies,	4. Effectiveness: Used against vectors of virus diseases in nurseries
5. Alternatives: Selected biopesticides	6. Role in IPM: Monitor insect populations to determine whether or not there is a need for application based on locally determined economic thresholds. It will be used until an effective less toxic biopesticide is identified, which is also compatible with parasitoids and predators and appropriate to IPM objectives. It will also be rotated with pesticides from other classes	7. Human Toxicological Hazards	8. Environmental Hazards
		Long-Term: Possible carcinogen and mutagen.	General: Toxic to fish and wildlife; do not apply directly to water; not toxic to birds
		Acute: Harmful or fatal if swallowed. May cause slight to moderate eye and skin irritation. Not readily absorbed through the skin	Non-Target Organisms: Highly toxic to bees, aquatic organisms
9. Location Environmental Conditions: Vegetable crop fields in Bangladesh, Cambodia, Nepal	10. Application Methods: Follow label for specific application method. Do not apply within 7 days of harvest. Do not apply before a rain event.	12. Storage Provisions and Disposal Issues: Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.	14. Training Program Elements: - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	11. Personal Protective Equipment: Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	13. Location Regulatory Issues Same as in #9	
15. Monitoring Plan: use, storage, transport, dispersal, disposal			



## USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): EMAMECTIN BENZOATE		Pesticide Use Type: Insecticide	
Formulation: Emulsifiable concentrate	% AI: 2.15	Location Common Names:	
USEPA registration status, code, & date: Active, Reg no: 100-903		Location registration status & date: add information for specific use location	
US Common Name: Denim		USEPA Tox Signal word: Danger	USEPA RUP flag: Restricted WHO Tox Class: II
Chemical Abstract Service (CAS) Registry Number: 119791-41-2		USEPA PC Code: 122806	Location Registration Code: specific to location
<b>1. Basis for Selection:</b> Emamectin is a natural fermentation product of a soil bacterium Streptomyces avermitilis. It is non systemic insecticides with translaminar movement.	<b>2. Crop / Target:</b> Onion, Chinese cabbage, tomato, eggplant, bean, water melon, cucumber, wax gourd, and pumpkin	<b>3. Pest / Disease:</b> Beet webworm, diamondback moth, eggplant caterpillar, army worms and thrips	<b>4. Effectiveness:</b> Registered for use in US.
<b>5. Alternatives:</b> Selected biopesticides	<b>6. Role in IPM:</b> Monitor insect populations to determine whether or not there is a need for application based on locally determined economic thresholds. It will be used until an effective less toxic biopesticide is identified, which is also compatible with parasitoids and predators and appropriate to IPM objectives. It will also be rotated with pesticides from other classes	<b>7. Human Toxicological Hazards</b>	<b>8. Environmental Hazards</b>
		<b>Long-Term:</b> May cause tremors but not likely a carcinogen	<b>General:</b> Extremely toxic to fish, birds, mammals and aquatic invertebrates
		<b>Acute:</b> Harmful if swallowed, inhaled or absorbed through skin. Causes moderate eye irritation.	<b>Non-Target Organisms:</b> Highly toxic to bees, direct exposure
		<b>Non-Target Ecosystems:</b> Aquatic areas, streams, ponds,	
<b>9. Location Environmental Conditions:</b> Vegetable crop fields in Bangladesh, Cambodia and Nepal	<b>10. Application Methods:</b> Follow label per formulation	<b>12. Storage Provisions and Disposal Issues:</b> Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.	<b>14. Training Program Elements:</b> - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	<b>11. Personal Protective Equipment:</b> Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	<b>13. Location Regulatory Issues</b> Same as in # 9	
<b>15. Monitoring Plan:</b> use, storage, transport, dispersal, disposal			

## USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): Fipronil		Pesticide Use Type: Insecticide	
Formulation: Suspension concentrate	% AI: 97%	Location Common Names: Defend	
USEPA registration status, code, & date: Active, 7969-207		Location registration status & date: add information for specific use location	
US Common Name: Regent		USEPA Tox Signal word: Warning	USEPA RUP flag: RUP WHO Tox Class: II
Chemical Abstract Service (CAS) Registry Number: 120068-37-3		USEPA PC Code: 129121	Location Registration Code: specific to location
1. Basis for Selection: Fipronil blocks GABA-gated chloride channels in the central nervous system. Disruption of the GABAA receptors by fipronil prevents the uptake of chloride ions resulting in excess neuronal stimulation and death of the target insect	2. Crop / Target: Vegetable crops	3. Pest / Disease: Aphids, thrips, leaf miners	4. Effectiveness: Registered for use in U.S.
5. Alternatives: Selected biopesticides	6. Role in IPM: Monitor insect populations to determine whether or not there is a need for application based on locally determined economic thresholds. It will be used until an effective less toxic biopesticide is identified, which is also compatible with parasitoids and predators and appropriate to IPM objectives. It will also be rotated with pesticides from other classes.	7. Human Toxicological Hazards	8. Environmental Hazards
		Long-Term: Possible human carcinogen.	General: Toxic to birds, fish and aquatic invertebrates
		Acute: May be fatal if swallowed, absorbed through skin or inhaled.	Non-Target Organisms:  Non-Target Ecosystems: Aquatic areas, streams, ponds,
9. Location Environmental Conditions: Vegetable crop fields in Bangladesh, Cambodia, Nepal	10. Application Methods: Follow label per formulation	12. Storage Provisions and Disposal Issues: Empty containers: rinse 3 times, empty into spray tank, puncture, bury Containers should NEVER be reused	14. Training Program Elements: - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	11. Personal Protective Equipment: Long-sleeved shirts and pants, chemical resistant gloves, protective eye wear, shoes, & socks	13. Location Regulatory Issues Same as in # 9	
15. Monitoring Plan: use, storage, transport, dispersal, disposal			



## USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): Metarrhizium anisopliae strain F52		Pesticide Use Type: Insecticide	
Formulation: Wettable Powder	% AI: 97.6	Location Common Names:	
USEPA registration status, code, & date: Active, 70127-7		Location registration status & date: add information for specific use location	
US Common Name: TAE-001 technical Bioinsecticide		USEPA Tox Signal word: Caution	USEPA RUP flag: Not Restricted WHO Tox Class: U
Chemical Abstract Service (CAS) Registry Number: 67892-13-1		USEPA PC Code: 029056	Location Registration Code: specific to location
<b>1. Basis for Selection:</b> Metarrhizium anisopliae is a natural biopesticide based on the naturally occurring fungus. It is effective against a variety of pests. Metarrhizium anisopliae should be applied when the temperature is between 18-28°C/65-82°F and the relative humidity is approximately 80% for several days after application.	<b>2. Crop / Target:</b> Vegetables and Mango	<b>3. Pest / Disease:</b> Lepidopteran pests and fruit flies	<b>4. Effectiveness:</b> Registered for use in US for similar pests.
<b>5. Alternatives:</b> Selected biopesticides	<b>6. Role in IPM:</b> Monitor insect populations to determine whether or not there is a need for application based on locally determined economic thresholds. It will also be rotated with pesticides from other classes	<b>7. Human Toxicological Hazards</b>	<b>8. Environmental Hazards</b>
		Long-Term: No expected long-term risks.	General: No major threats to non-target ecosystems
		Acute: Harmful if swallowed, inhaled or absorbed through skin. Causes moderate eye irritation.	Non-Target Organisms:  Non-Target Ecosystems:
<b>9. Location Environmental Conditions:</b> Vegetable crop fields in Bangladesh, Cambodia, Nepal and Mango in Bangladesh	<b>10. Application Methods:</b> Follow label per formulation	<b>12. Storage Provisions and Disposal Issues:</b> Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.	<b>14. Training Program Elements:</b> - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	<b>11. Personal Protective Equipment:</b> Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	<b>13. Location Regulatory Issues</b> Same as in # 9	
<b>15. Monitoring Plan:</b> use, storage, transport, dispersal, disposal			

## USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): Metiram		Pesticide Use Type: Fungicide	
Formulation: Wettable powder	% AI: %	Location Common Names: Polyram	
USEPA registration status, code, & date: Active, 7969-105-34704		Location registration status & date: add information for specific use location	
US Common Name:		USEPA Tox Signal word: Caution	USEPA RUP flag: GUP
Chemical Abstract Service (CAS) Registry Number: 59006-42-2		USEPA PC Code: 014601	Location Registration Code: specific to location
1. Basis for Selection: Broad spectrum, non-systemic fungicide with protective action. Multi-site activity.	2. Crop / Target: Vegetables	3. Pest / Disease: Late blight of potato and tomato	4. Effectiveness: Registered in U.S.
5. Alternatives: Selected biopesticides.	6. Role in IPM: These fungicides will be used against fungal pathogens until other biorational options are available to manage fungal diseases.	7. Human Toxicological Hazards	8. Environmental Hazards
		Long-Term: Possible carcinogen.	General: Slightly toxic to fish, birds
		Acute: Toxic by ingestion. Causes moderate eye irritation.	Non-Target Organisms: Non toxic to bees.
		Non-Target Ecosystems: Aquatic areas, streams, ponds,	
9. Location Environmental Conditions: Vegetable crop fields in Bangladesh, Cambodia, Nepal	10. Application Methods: Follow label for specific application method. Do not apply within 7 days of harvest. Do not apply before a rain event.	12. Storage Provisions and Disposal Issues: Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.	14. Training Program Elements: - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	11. Personal Protective Equipment: Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	13. Location Regulatory Issues Same as in # 9	
15. Monitoring Plan: use, storage, transport, dispersal, disposal			



## USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): PROPICONAZOLE		Pesticide Use Type: Fungicide	
Formulation: EMULSION CONCENTRATE	% AI: 41%	Location Common Names: Tilt	
USEPA registration status, code, & date: Active, 42750-212		Location registration status & date: add information for specific use location	
US Common Name: Tilt		USEPA Tox Signal word: Warning	USEPA RUP flag: WHO Tox Class: U
Chemical Abstract Service (CAS) Registry Number: 60207-90-1		USEPA PC Code: 122101	Location Registration Code: specific to location
<b>1. Basis for Selection:</b> It is a broad-spectrum fungicide and acts as a demethylation inhibitor of sterol biosynthesis (DMI) which disrupts membrane synthesis by blocking demethylation.	<b>2. Crop / Target:</b> Vegetable crops	<b>3. Pest / Disease:</b> Leaf spot diseases	<b>4. Effectiveness:</b> Registered and recommended for the control of many important plant diseases.
<b>5. Alternatives:</b> Selected biopesticides.	<b>6. Role in IPM:</b> Experimental use	<b>7. Human Toxicological Hazards</b>	<b>8. Environmental Hazards</b>
		Long-Term: Not a possible carcinogen.	General: This pesticide is toxic to fish and shrimp.
		Acute: Causes substantial but temporary eye injury. Harmful if swallowed, inhaled, or absorbed through skin	Non-Target Organisms: Non-Target Ecosystems: Aquatic areas, streams, ponds,
<b>9. Location Environmental Conditions:</b> Vegetable crop fields in Bangladesh, Cambodia, Nepal	<b>10. Application Methods:</b> Follow label for specific application method. Do not apply within 7 days of harvest. Do not apply before a rain event.	<b>12. Storage Provisions and Disposal Issues:</b> Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.	<b>14. Training Program Elements:</b> - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	<b>11. Personal Protective Equipment:</b> Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	<b>13. Location Regulatory Issues</b> Same as in # 9	
<b>15. Monitoring Plan:</b> use, storage, transport, dispersal, disposal			

USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): <i>Pseudomonas fluorescens</i>		Pesticide Use Type: Biopesticide	
Formulation:	% AI: 12.65%	Location Common Names:	
USEPA registration status, code, & date: Active, 71975-U		Location registration status & date: add information for specific use location	
US Common Name: ZEQUANOX		USEPA Tox Signal word: Warning	USEPA RUP flag: Not Restricted WHO Tox Class: U
Chemical Abstract Service (CAS) Registry Number: 9001-62-1		USEPA PC Code: 006418	Location Registration Code: specific to location
<b>1. Basis for Selection:</b> The bacteria prevents ice nucleation on plant leaves that leads to frost damage. Metabolites released by the bacteria are responsible for the antiphytopathogenic properties in some strains.	<b>2. Crop / Target:</b> Vegetable crops	<b>3. Pest / Disease:</b> Soil borne diseases	<b>4. Effectiveness:</b> Has been registered for use in US for similar pests.
<b>5. Alternatives:</b> Selected biopesticides	<b>6. Role in IPM:</b> Monitor insect populations to determine whether or not there is a need for application based on locally determined economic thresholds. It will be used until an effective less toxic biopesticide is identified, which is also compatible with parasitoids and predators and appropriate to IPM objectives. It will also be rotated with pesticides from other classes	<b>7. Human Toxicological Hazards</b>	<b>8. Environmental Hazards</b>
		Long-Term: No known mammalian chronic health effects.	General: Do not apply directly to water, or allow run-off to enter a waterway
		Acute: Harmful if inhaled.	Non-Target Organisms:  Non-Target Ecosystems: Aquatic areas
<b>9. Location Environmental Conditions:</b> Vegetable crop fields in Bangladesh, Cambodia, Nepal	<b>10. Application Methods:</b> Follow label for specific application method. Do not apply before a rain event.	<b>12. Storage Provisions and Disposal Issues:</b> Empty containers: rinse 3 times, empty into spray tank, puncture, bury Containers should NEVER be reused	<b>14. Training Program Elements:</b> - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	<b>11. Personal Protective Equipment:</b> Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	<b>13. Location Regulatory Issues</b> Same as in # 9	
<b>15. Monitoring Plan:</b> use, storage, transport, dispersal, disposal			



## USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): Thiophanate Methyl		Pesticide Use Type: Fungicide	
Formulation: Wettable powder	% AI: 50%	Location Common Names: Turbin	
USEPA registration status, code, & date: Active, 1381-228		Location registration status & date: add information for specific use location	
US Common Name:		USEPA Tox Signal word: Caution	USEPA RUP flag: GUP WHO Tox Class: IV
Chemical Abstract Service (CAS) Registry Number: 23564-05-8		USEPA PC Code: 102001	Location Registration Code: specific to location
1. Basis for Selection: Systemic fungicide with protective and curative mode of action. It acts by binding to tubulin and blocking mitosis	2. Crop / Target: Vegetables	3. Pest / Disease: Powdery mildew, rust	4. Effectiveness: Registered in U.S.
5. Alternatives: Selected biopesticides.	6. Role in IPM: These fungicides will be used against fungal pathogens until other biorational options are available to manage fungal diseases.	7. Human Toxicological Hazards	8. Environmental Hazards
		Long-Term: Possible carcinogen.	General: Toxic to fish
		Acute: Harmful if swallowed, absorbed through skin or inhaled. Causes moderate eye irritation	Non-Target Organisms: Not toxic to bees.  Non-Target Ecosystems: Aquatic areas, streams, ponds,
9. Location Environmental Conditions: Vegetable crop fields in Bangladesh, Cambodia, Nepal	10. Application Methods: Follow label for specific application method. Do not apply within 7 days of harvest. Do not apply before a rain event.	12. Storage Provisions and Disposal Issues: Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. Do not reuse empty container.	14. Training Program Elements: - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	11. Personal Protective Equipment: Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	13. Location Regulatory Issues Same as in # 9	
15. Monitoring Plan: use, storage, transport, dispersal, disposal			

## USAID Pesticide Data Sheet 2017

Date: 6/11/2018 Project: Asia Vegetable and Mango IPM

Location: Bangladesh, Cambodia, Nepal

USAID Tracking Code: n/a

Active Ingredient (AI): Trichoderma harzianum		Pesticide Use Type: Biological	
Formulation: Wettable powder	% AI: 22	Location Common Names: Trichoderma harzianum	
USEPA registration status, code, & date: Active, 68539-4		Location registration status & date: add information for specific use location	
US Common Name:		USEPA Tox Signal word: Caution	USEPA RUP flag: Not Restricted WHO Tox Class: U
Chemical Abstract Service (CAS) Registry Number: 67892-31-3		USEPA PC Code: 119202	Location Registration Code: specific to location
<b>1. Basis for Selection:</b> It is a naturally occurring mitosporic fungal insecticide that is commonly found in soils worldwide and is used as a pesticide for controlling many kinds of soil and foliar pathogens.	<b>2. Crop / Target:</b> Vegetables and Mango	<b>3. Pest / Disease:</b> Soil fungal diseases	<b>4. Effectiveness:</b>
<b>5. Alternatives:</b> Selected biopesticides	<b>6. Role in IPM:</b> Monitor insect populations to determine whether or not there is a need for application based on locally determined economic thresholds. It will also be rotated with pesticides from other classes	<b>7. Human Toxicological Hazards</b>	<b>8. Environmental Hazards</b>
		Long-Term: No expected long-term risks.	General: None
		Acute: Causes eye irritation, repeated exposure may cause allergic disorders. Harmful if absorbed through the skin, inhaled or swallowed.	Non-Target Organisms: None
<b>9. Location Environmental Conditions:</b> Vegetable crop fields in Bangladesh, Cambodia, Nepal and Mango in Bangladesh	<b>10. Application Methods:</b> Follow label per formulation	<b>12. Storage Provisions and Disposal Issues:</b> Empty containers: rinse 3 times, empty into spray tank, puncture, bury Containers should NEVER be reused	<b>14. Training Program Elements:</b> - follow label per formulation - application - handling - disposal - PPE - entry intervals - pre-harvest intervals
	<b>11. Personal Protective Equipment:</b> Follow label per formulation long-sleeved shirts and pants, gloves, shoes and socks	<b>13. Location Regulatory Issues</b> Same as in # 9	
<b>15. Monitoring Plan:</b> use, storage, transport, dispersal, disposal			